Severe local storms, June, 1928—Continued

Place	Date	Time	Width of path (yards)	Loss of life	Value of property destroyed	Character of storm	Remarks	Authority
Sherman County, Kans. (southern).	22	2 p. m.	[1] 1–2		100,000	Hail	Chief damage to wheat; path 15 miles	Official, U. S. Weather Bureau.
Lyman, Nebr.	22	4 p. m.			15,000	do	Crops damaged.	Do.
Spokane (near) and Sumner, Wash.	22	P. m.				do	Severe damage to commercial orchards and raspberry fields.	Do.
Garnett, Kans.	22					Tornado	No details reported	Do.
Van Zandt County, Tex.	23	12.30 a. m.	[1] 6		105,000	Wind and hail	Extensive damage to crops and buildings over path 30 miles long.	Do.
Pawnee County, Nebr. (southwestern).	23	3 a. m.			25,000	Hail	Much crop damage in places	Do.
Gotebo, Okla.	23	5 a. m.	[1] 5		65,000	do	Practically all buildings damaged to some extent; crops loss heavy.	Do.
Gove County, Kans. (southwestern).	23	Near noon.	14			Tornado	Minor damage	Do.
Nucholls County, Nebr. (central and southwestern).	23	1 p. m.	[1] 8		300,000	Hail and rain	Heavy crop damage; livestock injured, windows broken; path 8 miles.	Do.
Republic and Cloud Counties, Kans.	23	2–3 p. m.	[1] 3–6		275,000	Heavy hail	Greatest loss to wheat; path 43 miles	Do.
Cedar (northeast) and Dixon (northwest) Counties, Nebr.	23	3 p. m.			10,000	Tornado	Farm buildings wrecked; 1 person injured; path 7 miles.	Do.
Kettle Falls, Wash.	23	do			10,000	Hail	Apple crops, gardens and windows damaged	Do.
Colfax County, Nebr.	23	4–5 p. m.	[1] 2		20,000	do	Crops damaged; windows broken; path 12 miles.	Do.
Webster County, Nebr. (northern).	23	5–6 p. m.	[1] 2		25,000	do	Crops damaged 50 per cent in places; path 15 miles.	Do.
Arlington, Kans.	23	7 p. m.	8–440			Tornado	Property damage comparatively small	Do.
Clovis, N. Mex.	23	P. m.				Heavy hail	Heavy damage to wheat, buildings, etc.	Do.
Webb City, Okla.	24	2.30 a. m.			31,000	do	Crops damaged	Do.
Trementina, N. Mex.	24	3 p. m.				Hail	Crops considerably beaten	Do.
Haxtun and Dailey, Colo.	25	2.30 p. m.	[1] 6		400,000	do	Severe property damage over 30-mile path.	Do.
Carnegie, Okla.	25	4.30 p. m.			25,000	do	Crops damaged	Do.
Newville and Blosserville, Pa.	25					Wind	Several buildings damaged or destroyed; trees uprooted; crops beaten.	Do.
Midwest, Wyo.	26	4.15 p. m.	150		360,000	Tornado	Many buildings and derricks wrecked; crops injured; 8 persons hurt.	Do.
Shawnee, Wyo.	26	5 p. m.	[1] 9		5,000	Wind and hail	Buildings and crops damaged	Do.
Jefferson County, Nebr. (western).	26	6.30–7 p. m.	1,760		6,000	Hail	Wheat and oats damaged 20 to 80 per cent in places; path 8 miles.	Do.
Torrington, Wyo.	26	6.30 p. m.	[1] 4		17,000	Wind and hail	Crops and buildings damaged	Do.
Friona, Tex.	26	10 p. m.	[1] 8		75,000	Hail	do	Do.
Wichita Falls, Tex. (near)	27	2 a. m.	880	1	5,000	Hail and wind	Farm property damaged; 2 persons injured	Do.
Wessington, S. Dak.	27	P. m.	30		500	Tornado	Small damage to farm property	Do.
Keokuk County, Iowa.	28	1.30 p. m.			7,500	do	Details not reported	Do.
Lucas County, Iowa.	28	*4 p. m.*			3,000	do	do	Do.
Limon, Colo.	28	7.15 p. m.	[1] 2		25,000	Hail	do	Do.
Bumpus Mills, Rutherford, Md., and Southside, Tenn.	28	P. m.			40,000	Tornadic winds	Much property damage reported; 19 persons injured.	Do.
Des Moines County, Iowa.	28				30,000	Wind, hail and flood.	Considerable property damage	Do.
Nashville, Tenn. (near)	29	1 a. m.		1	50,000	2 tornadic windstorms.	A number of buildings damaged or totally wrecked; many trees uprooted; telephone service crippled.	Do.
Alexandria, Tenn.	29	2 a. m.			100,000	Tornadic wind	Extensive property and crop damage	Do.
Johnstown, Colo. (near)	29	12.30 p. m.	500	3	250,000	Tornado	Farm buildings and equipment wrecked; livestock killed; crops ruined; 50 persons injured.	Do.
Gillette, Wyo. (near)	29	1.45 p. m.	67		2,000	do	Buildings and crops damaged; livestock injured.	Do.
Easley, S. C.	29	9.30 p. m.	200		60,000	do	25 or 30 houses damaged; 2 persons injured	Do.
El Paso, Elbert, and Lincoln Counties, Colo.	29	P. m.				Hail and rain	Severe crop loss; soil badly washed in places	Do.
Spartanburg County, S. C.	29	do	200		150,000	Wind and rain	Dwellings, outhouses, crops, and trees badly damaged.	Do.
Riverton, Wyo.	29				5,800	Hail	Crops damaged over small area	Do.

[1] Miles.

RIVERS AND FLOODS

By H. C. FRANKENFIELD

In general, June was a month of unusually heavy rainfall east of the 100th meridian, and as a result floods of some kind occurred over all that section of the country except New England and the Middle Atlantic States. As a rule the floods were of moderate character, and only in the Grand River of Missouri, the White and Black Rivers of Missouri and Arkansas, and the lower Neosho and Verdigris Rivers of Kansas and Oklahoma did they attain more than fair proportions. However, the aggregate damage was much greater than would be supposed at first thought—both on account of the large acreage of crop lands overflowed and of the numerous washouts and overflows of quite small streams.

Atlantic drainage.—Only local floods in the lower Santee River of South Carolina during the first decade of the month, and in the Broad River of the same State on the last day. Previous high waters had left the swamp floors in a very soggy condition and consequently there was little or no movement of livestock and therefore no losses.

East Gulf drainage.—During June 3, 4, and 5, rainfall over the Tallapoosa, Cahaba, and Alabama River drainage areas ranged from 2.75 to 9.50 inches, Montgomery, Ala., reporting 7.34 and Selma, Ala., 6.10 inches during the 24 hours ending 8 a. m. June 5. Warnings were first sent during the afternoon of June 4 for the Tallapoosa River and on the following morning for the Cahaba and Alabama Rivers. Owing to the frequent manipulation of the gates of the various power plant dams above, accurate forecasts for the Alabama River were not possible until the morning of June 6. Flood stages were not reached on the Coosa River. Losses and damage reported were as follows:

Miscellaneous	$66,450
Crops, matured	11,400
Crops, prospective (19,420 acres)	154,150
Livestock, etc	2,400
Suspension of business	19,025
Total	253,425

Money value of property saved through Weather Bureau flood warnings, $89,100.

The excessive rains also covered the drainage basin of the lower Tombigbee River of Alabama, and rather severe

floods resulted from Demopolis, Ala., to the mouth of the river. At Demopolis the crest stage was 45.9 feet, 6.9 feet above the flood stage, and only very low bottoms were overflowed; but near the mouth of the river, where the rainfall had been heaviest, the water over some of the bottoms was nearly as high as in May, 1928, when the crest stage at Demopolis was 61.2 feet on May 1. Heavy rains on June 14 again brought the river to the flood stage at Demopolis, and for the third time during the month of June 28th, the river cresting at 42.3 feet on the morning of June 30, and falling below the flood stage on July 2.

Losses and damage amounted to $121,875, of which $96,000 was in prospective crops, while the reported value of property saved through the flood warnings was $42,510.

Over the Pascagoula and lower Pearl River systems of Mississippi the rainfall of early June was even greater than to the eastward, ranging from 5 to nearly 15 inches. The major portion of the rains centered in the 24 hours ending at 8 a. m. June 5, and the resulting floods did great damage to highways, bridges, and crops. Losses as reported were as follows:

Bridges, highways, lumber, etc	$749,000
Crops, actual	18,000
Crops, prospective	[1] 310,000
Livestock	3,600
Suspension of business	24,000
Total	1,104,600

Value of property saved through warnings: $30,000, plus a large figure in livestock.

Mississippi drainage.—In the State of Ohio the month was, with the exception of June, 1902, the wettest June for 46 years, and but for the fact that it followed one of the driest Mays on record the resulting floods would certainly have been much more serious. As it happened the floods were not general, and those that did occur in the Hocking and lower Scioto Rivers were not very severe, although they caused the loss of one life and damage amounting to about $50,000, of which about 90 per cent was in crops in which 4,145 acres were involved. Warnings were issued as required, but no estimate could be made of benefits resulting therefrom.

A heavy two-day rain of nearly 3 inches on June 28 and 29 caused a great rise in Twelve Pole Creek, a small tributary of the Ohio River, and at 2 a. m. June 30 the creek at Wayne, W. Va., reached a stage of 28.3 feet, 3.3 feet above the flood stage, and the highest stage of which there is record. At the same time a rain of 5.50 inches at Lexington, Ky., brought the Town Branch, the local drainage brook, over its banks and into the streets of Lexington, covering the commercial section of Main Street to a depth of from 6 to 24 inches. The total damage amounted to more than $700,000, of which about $500,000 was in housed tobacco and $160,000 in hotel property.

A flood in Green and Big Barren Rivers of Kentucky was caused by a heavy two-day rain of 2 or 3 inches on June 8 and 9. While the stages were not unusually high the damage was very great owing to the inundation of from 50,000 to 75,000 acres of planted corn and tobacco, principally in Ohio, McLean, and Daviess Counties. The American Red Cross was called upon to furnish aid to several hundred families in seven counties, and the total losses were estimated at $2,000,000. Not much could be saved by warnings, only $27,500 having been reported.

[1] Very incomplete. Probably twice as much.

There was a moderate flood in the West Fork of the White River of Indiana, causing damage amounting to about $77,000, of which $75,000 was in prospective crops. The total damage to prospective crops will far exceed these figures and will cover a much wider area, but it was due to standing water from downpours of rain collecting on the bottoms or washing slopes, and to overflows of small creeks.

The flood in the Cumberland River of Kentucky and Tennessee was caused by rains of 4.5 to 6.5 inches on June 28 and 29. At Burnside, Ky., the river rose 39.5 feet in two days, reaching a crest of 54 feet, 4 feet above the flood stage, during June 30. There were also proportionate rises below, and the total damage reported aggregated $1,208,500, of which $965,000 was in prospective crops. The money value of property saved through the warnings was $38,000.

The rainfall over the drainage area of the upper Tennessee River was no less severe, yet measured by actual stages of the rivers the floods were more moderate. However, the damage reached relatively enormous proportions on account of the huge losses in prospective crops as well as to the fields themselves. As usual, small creeks contributed greatly, and rough estimates of the damage were as much as $3,500,000, with little or no savings from warnings owing to the character of the damage.

Naturally, a general and decided rise was in progress in the Ohio River at the close of the month, but flood stages had not been reached at any place.

Heavy rains from June 20 to 22 caused a severe flood in the Salt River of northeastern Missouri, with a stage at New London on June 21 of 28 feet, 8 feet above the flood stage. There was considerable damage of the usual character, and traffic was interrupted for two days. The damage amounted to about $365,000, of which $150,000 was in prospective crops.

The flood in the Mississippi River below the mouth of the Missouri River was still in progress below the mouth of the Ohio River, and it will be discussed in the REVIEW for July, 1928. This report will include the very disastrous flood in the St. Francis River of Missouri and Arkansas.

With other States, Missouri was also very wet in June, with an excess of as much as 16 or 17 inches at some places. Illinois was also very wet, with an excess as high as 13 inches in places. The rains were well distributed, but in Missouri there were short periods of very heavy fall with resulting floods of which those in the small streams were the most destructive. As in other States, the greatest losses were in growing crops that no warnings could save, although many were issued. The statement of losses will be combined with those of July in the REVIEW for that month.

Eastern Kansas contributed a full measure to the flooded areas, and with very little variation as to causation, character, and ultimate results. Again the stages of water in the larger streams were not at all unusual, while the overflows of the small streams caused the most damage. The Osage River flood of June 1 and 2 inundated 4,000 acres of farm lands, causing losses in prospective crops of about $48,000, a comparatively small item when compared with $864,000 reported from the Neosho Basin. Of this large amount, $368,000 was in growing crops, $317,000 in matured crops, and $82,500 in livestock and other movable farm property. As usual under such circumstances, the savings through the flood warnings were small, only $25,000 having been reported.

Arkansas River floods within the State of Kansas were not of consequence, although overflows of smaller streams flooded several hundred acres of farm lands.

The Arkansas River was quite high much of the month below the Kansas line, with flood stages from Webbers Falls, Okla., to Morrilton, Ark., and moderate floods also occurred in the Verdigris and lower Neosho Rivers. Once more crops suffered greatly, 28,400 acres having been overflowed, with losses amounting to $300,000, of which $220,000 was in growing crops. Other losses reported amounted to $56,000. The reported value of property saved through the warnings was $40,000. It appears that in the State of Oklahoma the larger streams were directly responsible for the greater portion of the losses.

The floods in the White and Black Rivers of Arkansas were severe, with stages much above the flood line. The levee along White River just below Newport, Ark., broke, and 90,000 acres of land were inundated. The season was so late that much of the land can not be replanted, none at all to cotton, and the losses therefore in prospective crops alone will exceed $1,000,000. Levee losses were $123,000 and others about $155,000, making a total of approximately $1,278,000. Savings through warnings were given as $131,000.

Very heavy local rains centering on June 23 caused moderate floods in the Sulphur and Cypress Rivers of Texas, tributaries of the Red River. Losses as reported amounted to about $50,000, mostly in prospective crops, while the reported value of property saved through the warnings was $20,000.

There were unimportant floods in the Colorado River and in its tributaries within the State of Colorado, with only one loss of consequence, that of the new highway bridge across the Colorado River near Blythe, Calif., through the undermining of the piers. The loss was estimated at $100,000.

The following report on the annual rise of the Columbia River was prepared by Mr. Edward L. Wells, Meterologist in charge of the Weather Bureau office at Portland, Oreg.:

The 1928 rise of the Columbia River was unusual in several respects. The quantity of water passing down the river was less than in the high-water period in 1927, and the duration of high stages was less than in 1927 and not more than in an ordinary year, yet the crest of the rise, as shown by records of backwater in the Willamette at Portland, was the highest since 1894.

Information assembled at the close of the snow season, as of March 31, indicated that over the drainage basin of the Columbia River September, November, December, and March had been relatively wet, while October, January, and February were much drier. The soil was moist under the snow, and the snow supply was somewhat above normal, with the lower layers compact and the upper layers rather loose. Opinions differed somewhat as to whether the snow supply at the close of March was greater than at the close of the corresponding month in 1927. In marked contrast to the public attitude in 1927, there was very little local apprehension of a serious flood.

The snowfall bulletin issued after the close of March stated that with normal weather prevailing till early in June the crest at Portland should be between 20 and 22 feet.

April was unusually cool in the mountain area, and there was little metling of snow in the high mountains till near the close of the month; moreover, much new snow fell during the month. This cold April was followed by an abnormally hot May. Over much of the drainage basin of the Columbia River it was the warmest May in 30 years. There was a notable absence of the usual short periods of freezing nights in the mountain areas. The closing days of May were marked by a gerneral change to cooler weather, and temperature through most of June was subnormal.

These conditions resulted in a distinct shortening of the period of rapid melting, and materially increased the rate of melting in May. Consequently the crest of the rise at Portland was more than 2 feet above the extreme which had been expected if normal conditions had prevailed, and occurred 10 days in advance of the average date.

Actual forecasts of river stages, issued from day to day for three days in advance, were timely and accurate, permitting the saving of practically all movable property and obviating necessity of moving property which was not endangered.

On April 28, the stage at Portland being 8.6 feet, the public was advised that the annual rise had begun. At this time definite stage forecasts were inaugurated. On May 8 warning was issued for the flood stage of 15 feet by the 11th. This stage was reached at 5 a. m. on the 12th. On May 28 it was stated that the Willamette at Portland would come to a stand on the afternoon of the 30th at about 24.6 feet. The crest was 24.4 feet, reached at 3 a. m. on the 31st.

Following is an approximate statement of the losses caused by the flood:

Tangible property	$27, 530
Matured crops	87, 300
Prospective crops (including pasture)	118, 875
Livestock and other movable property	340
Suspension of business	49, 235
Moving goods, pumping, etc	12, 571
Total	295, 851

Items on reports received indicate that property was saved by the warnings amounting to $443,650, but it is known that much property was saved which is not included in these items. It is not possible to get in touch with those who receive the warnings by radio or through the press, and even those who are communicated with and furnish reports often state that they saved all their property but do not place a value on it.

The floods of June, 1928, were notable in two respects: (1) in their wide distribution, indicating an unusually wet month, and (2) in the enormous amount of loss of prospective crops caused by overflows of quite small streams, the large streams contributing much the minor share.

The total reported losses of crops aggregated $9,033,725, of which $8,600,025 were in prospective crops, the States of Tennessee (eastern), Kentucky, Arkansas, Oklahoma (eastern), and Kansas (eastern) contributing nearly $7,000,000. These figures do not include losses within the State of Missouri which will be reported later.

[All dates in June except as otherwise specified]

River and station	Flood stage	Above flood stages—dates		Crest	
		From—	To—	Stage	Date
ATLANTIC DRAINAGE	*Feet*			*Feet*	
Lackawaxen: Hawley, Pa	9	30	30	10.0	30
Santee:					
Rimini, S. C	12	(1)	5	14.1	May 30
		9	10	12.3	9
Ferguson, S. C	12	(1)	3	13.4	May 30
		9	10	12.0	9–10
Broad: Blairs, S. C	15	30	30	15.8	30
EAST GULF DRAINAGE					
Chattahoochee: Columbus, Ga	20			21.5	5–6
Alabama:					
Montgomery, Ala	35	6	8	39.4	7
Selma, Ala	35	6	11	45.4	8
Tallapoosa: Milstead, Ala	40	5	5	41.0	5
Cahaba: Centerville, Ala	25	5	5	25.0	5
Tombigbee: Lock 4, Demopolis, Ala	39	6	12	45.9	8
		17	17	39.0	17
		28	(2)	42.3	30
Pascagoula: Merrill, Miss	20	6	12	24.6	8
Chickasawhay:					
Enterprise, Miss	21	5	8	24.3	7
Shubuta, Miss	27	5	11	35.0	5
Leaf: Hattiesburg, Miss	19	6	7	19.8	6
Pearl:					
Monticello, Miss	18	15	19	23.8	16
Columbia, Miss	18	7	7	18.3	7
		16	21	24.0	19
West Pearl: Pearl River, La	13	5	28	17.0	6
MISSISSIPPI DRAINAGE					
Shenango: Sharon, Pa	9	7	7	9.1	7
Tuscarawas: Gnadenhutten, Ohio	9	6	12	10.6	10
Hocking: Athens, Ohio	17	22	22	18.3	22
Twelve Pole Creek: Wayne, W. Va	25	29	30	28.3	30
Scioto: Circleville, Ohio	10	21	22	11.2	21

[1] Continued from last month. [2] Continued at end of month.

River and station	Flood stage	Above flood stages—dates From—	To—	Crest Stage	Date
MISSISSIPPI DRAINAGE—continued					
Green:	*Feet*			*Feet*	
Lock No. 6, Brownsville, Ky	30	10	13	32.8	12
Lock No. 4, Woodbury, Ky	33	6	16	39.5	11
Lock No. 2, Rumsey, Ky	34	9	25	40.3	18
Big Barren: Bowling Green, Ky	20	7	7	20.2	7
Tippecanoe: Norway, Ind	6	20	20	6.1	20
White, West Fork:					
Elliston, Ind	19	8	12	21.2	11
Edwardsport, Ind	15	8	14	17.6	12–13
		23	26	15.3	23, 25
Cumberland:					
Burnside, Ky	50	30	July 1	54.0	30
Celina, Tenn	45			43.9	July 1
Carthage, Tenn	40	July 1	July 4	54.2	July 2
Nashville, Tenn	40	30	July 7	42.9	July 5
Clarksville, Tenn	46	30	---do---	48.0	July 2
Lock F, Eddyville, Ky	57			56.4	July 9
New: New River, Tenn	25	30	30	31.2	30
French Broad: Dandridge, Tenn	12	30	30	13.9	30
Big Pigeon: Newport, Tenn	6	29	30	11.4	29
Clinch: Clinton, Tenn	25	30	30	28.6	30
Elk: Fayetteville, Tenn	14	14	14	15.8	14
Mississippi:					
Alton, Ill	21	22	23	21.8	22
Chester, Ill	27	22	24	28.0	23
Cape Girardeau, Mo	30	22	25	32.9	23
New Madrid, Mo	34	17	(2)	35.4	25
Memphis, Tenn	35	27	28	35.0	27–28
Helena, Ark	44	28	(2)	44.4	30
Arkansas City, Ark	48	25	(2)		
Greenville, Miss	42	28	(2)		
Vicksburg, Miss	45	29	(2)		
Salt: New London, Mo	20	21	21	28.0	21
Meramec:					
Steelville, Mo	12	10	10	17.3	10
Pacific, Mo	11	10	13	18.1	12
		15	15	11.7	15
		20	23	16.4	21
		29	(2)	14.5	30
Valley Park, Mo	14	10	13	20.2	12
		15	15	14.1	15
		20	23	20.9	22
		29	(2)	18.2	30
Bourbeuse: Union, Mo	12	30	30	13.1	30
St. Francis:					
St. Francis, Ark	17	5	(2)	26.7	26
Marked Tree, Ark	17	26	(2)		
Missouri:					
Hermann, Mo	21	21	22	23.7	21
St. Charles, Mo	25	13	14	25.2	14
		21	24	30.1	21
		29	29	25.5	29
Solomon: Beloit, Kans	18	19	21	21.0	20
		24	26	22.6	26
Grand:					
Gallatin, Mo	20	18	20	29.6	19
Chillicothe, Mo	18	18	21	27.8	20
Brunswick, Mo	12	20	23	12.6	20, 22
Grand, Thompsons Fork: Trenton, Mo	20	18	18	22.1	18
Osage:					
Quen[illegible]ns	30	1	2	32.6	2
Osceo[illegible]	20	11	12	23.3	11
Warsa[illegible]	22	11	12	23.4	11
Arkansas:					
Great[illegible]Kans	5	6	6	5.7	6
		14	14	5.3	14
Hutchinson, Kans	6	6	7	6.2	6
		8	8	6.0	8
Arkansas City, Kans	15	10	10	15.0	10
		17	20	16.4	18
Webbers Falls, Okla	23	22	25	25.6	23
Fort Smith, Ark	22	14	15	22.8	15
		23	26	24.8	24
Dardanelle, Ark	20	14	16	22.2	14
		23	27	22.9	25
Morrilton, Ark	20	14	16	21.5	15
		24	28	22.4	25
Yancopin, Ark	29	15	(2)		
Purgatoire: Higbee, Colo	4	1	1	4.0	1
Neosho:					
Neosho Rapids, Kans	22	2	2	23.4	2
Le Roy, Kans	24	2	4	25.1	2
		17	17	24.0	17
Iola, Kans	15	2	5	17.1	4
		18	19	16.5	18
Chanute, Kans	20	4	6	22.0	5
		9	9	20.5	9
		18	20	22.9	19
Parsons, Kans	22	3	5	22.3	3
		18	22	23.8	19, 20
Oswego, Kans	17	2	8	21.1	3
		10	12	20.7	11
		18	23	23.1	19, 20
Wyandotte, Okla	23	21	23	25.5	22
Pensacola, Okla	24	22	23	25.2	22
Fort Gibson, Okla	22	20	25	27.0	23
Verdigris:					
Independence, Kans	30	10	11	34.6	10
		18	21	36.9	21
Sageeyah, Okla	35	23	25	37.0	42

[1] Continued at end of month.

River and station	Flood stage	Above flood stages—dates From—	To—	Crest Stage	Date
MISSISSIPPI DRAINAGE—continued					
Canadian:	*Feet*			*Feet*	
Logan, N. Mex	4	3	3	5.0	3
		10	10	6.6	10
Woodward, Okla	4	16	16	4.0	16
Petit Jean: Danville, Ark	20	15	17	23.7	15
		24	25	20.8	25
White:					
Cotter, Ark	21	13	13	27.8	13
		22	24	24.6	23
Calico Rock, Ark	18	13	18	39.2	14
		22	25	29.5	24
Batesville, Ark	23	11	11	23.7	11
		13	19	37.6	14
		21	27	33.0	24
Newport, Ark	26	14	(2)	32.6	25
Georgetown, Ark	22	15	(2)	29.9	27
DeValls Bluff, Ark	24	17	(2)	28.5	28–29
Clarendon, Ark	30	21	(2)		
Black:					
Leeper, Mo	11	10	10	15.4	10
		21	21	12.9	21
Williamsville, Mo	11	10	10	14.4	10
		13	14	14.1	14
		21	21	13.6	21
		23	23	11.4	23
Poplar Bluff, Mo	14	10	16	17.8	15
		19	25	17.7	23
		30	30	14.3	30
Corning, Ark	11	5	(2)	15.0	19
Black Rock, Ark	14	5	(2)	26.6	22
Cache: Patterson, Ark	9	10	(2)	11.8	27–28
Sulphur:					
Ringo Crossing, Tex	20	24	27	25.6	25
Finley, Tex	24	28	(2)	28.6	29
Cypress: Jefferson, Tex	18	30	(2)	19.3	July 1
WEST GULF DRAINAGE					
Trinity: Dallas, Tex	25	11	11	25.3	11
		28	30	31.0	29
Rio Grande: San Marcial, N. Mex	3	(1)	7	3.5	3
PACIFIC DRAINAGE					
Colorado:					
Grand Junction, Colo	11	(1)	3	11.7	1
Fruita, Colo	12	May 27	4	14.0	1
Parker, Ariz	7	(1)	(2)	11.9	8
Colorado, Roaring Fork: Carbondale, Colo	5	(1)	3	6.2	1
		27	29	5.3	27
Eagle: Eagle, Colo	5	(1)	2	6.0	May 31
Gunnison:					
Sapinero, Colo	19	(1)	3	20.2	1
Delta, Colo	9	(1)	10	11.5	May 31
Green: Elgin, Utah	12	(1)	5	13.0	May 31–June 1
Columbia:					
Marcus, Wash	24	(1)	(2)	34.2	May 30–31
The Dalles, Oreg	40	(1)	2	42.1	May 29
Vancouver, Wash	15	(1)	23	25.4	May 31
Kootenai: Bonners Ferry, Idaho	26	(1)	1	30.0	May 28
Pend O'Reille: Newport, Wash	16	(1)	18	24.2	1
Willamette: Portland, Oreg	15	(1)	21	24.4	May 31

[1] Continued from last month. [2] Continued at end of month.

MEAN LAKE LEVELS DURING JUNE, 1928

By UNITED STATES LAKE SURVEY

[Detroit, Mich., July 5, 1928]

The following data are reported in the "Notice to Mariners" of the above date:

Data	Lakes[1] Superior	Michigan and Huron	Erie	Ontario
Mean level during June, 1928:	*Feet*	*Feet*	*Feet*	*Feet*
Above mean sea level at New York	602.47	580.12	572.39	246.59
Above or below—				
Mean stage of May, 1928	+0.31	+0.19	+0.32	−0.02
Mean stage of June, 1927	+0.21	+0.68	+0.19	+0.48
Average stage for June last 10 years	+0.62	+0.02	+0.03	+0.40
Highest recorded June stage	−0.96	−3.49	−2.13	−2.04
Lowest recorded June stage	+1.97	+1.71	+1.21	+1.70
Average departure (since 1860) of the June level from the May level	+0.28	+0.23	+0.17	+0.14

[1] Lake St. Clair's level: In June, 1928, 575.16 feet.